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The use of antibiotics and certain other antibacterial agents in rations for growing swine has been hailed as one of the most important developments in swine nutrition in the last ten years. Although the use of antibiotics has become quite commonplace in swine rations, their continuous use in swine feeds has raised the question as to whether an antibiotic loses some of its effectiveness when fed continuously in a swine feeding program.

The object of this experiment was to determine the effect on rate of gain and feed efficiency of some of the newer antibiotics in relation to an antibiotic (chlortetracycline) that has been fed in the South Dakota Station herd for a number of years.

Experimental Procedure

Experiment I (Winter 1959). Seventy-two weanling pigs averaging approximately 33 pounds in weight were allotted according to sex, weight, and litter into twelve lots of six pigs each. All pigs were self-fed the complete mixed basal ration shown in table 1. The pigs were housed and fed on concrete floored lots. Two replicated lots of pigs received each of the following experimental treatments:

Lot		To 110 lbs. grams/ton of feed	110-200 lbs. grams/ton of feed
1	Control	--	--
2	Control + chlortetracycline	50	25
3	Control + erythromycin	20	10
4	Control + SPS (41.8% streptomycin, 16.4% penicillin, 41.8% sulfaquinoxaline)	75	37.5
5	Control + Pro-Strep (25% penicillin, 75% streptomycin)	50	25
6	Control + Tylosin	40	20

Experiment II (Summer, 1960). The basal ration remained the same as outlined for experiment 1 (Table 1). The experimental treatments were:

Lot		To 110 lbs. grams/ton of feed	110-200 lbs. grams/ton of feed
1	Control	--	--
2	Control + chlor~~ay~~tetracycline	25	12.5
3	Control + arsanilic acid	90	90
4	Control + SPS	50	25
5	Control + Pro-Strep	40	20
6	Control + Tylosin	20	10

Table 1. Composition of basal ration

	To 110 lbs.	110-200 lbs.
	lbs.	lbs.
Ground shelled corn	810	900
Soybean meal (44%)	125	58
Tankage (60%)	50	23
Limestone	7	7
Dicalcium phosphate	2	6
T. M. Salt (Hi Zn)	5	5
B-vitamin supplement[1]	1	1

[1] Furnishes 1 mg. riboflavin, 2 mg. pantothenic acid, 4.5 mg. niacin, 5 mg. choline, and 5 mcg. vitamin B_{12} per pound of ration.

Results and Discussion

Summaries of the two experiments are shown in Tables 2 and 3.

Experiment I. During the intial twenty-four day feeding period, pigs fed each of the antibiotics or antibiotic combinations gained considerably faster than the control pigs. Pigs fed erythromycin gained 0.16 pound per day faster than the controls, while the other antibiotic-fed pigs gained from 0.29 to 0.35 pound per day faster than the controls. Feed efficiency was improved by about .2 to 11 per cent during this period.

A similar response to antibiotic feeding was observed from 60 to 110 pounds. During this period the antibiotic-fed pigs gained from 0.30 to 0.42 pound per day more than the control pigs. All antibiotics improved feed efficiency during this period. During the finishing period (110 to 200 lbs.) the control pigs gained at about the same rate as did those pigs fed antibiotics.

The results for the entire feeding period also showed an improvement in rate of gain when each of the antibiotics was fed. Tylosin, streptomycin-penicillin-sulfaquinoxaline mixture, and penicillin-streptomycin improved gains approximately 13 per cent, while chlortetracycline and erythromycin improved gains 7 to 8 per cent. Pigs fed the "newer" antibiotics gained slightly faster than those fed the "older" antibiotics in this trial. Feed efficiency was approximately the same for all lots, except lot 4 (SPS) which was more efficient.

Experiment II. Pigs fed the antibiotics and arsanilic acid gained faster than the controls by 4 to 15 per cent. The trend for faster growth was established early in the trial. Tylosin and chlortetracycline improved gains 15 and 13 per cent respectively. Feed consumption was greater with the antibiotics and arsanilic acid than the controls. The control and arsanilic acid lots had the best feed efficiency by approximately 3 to 6 per cent.

While antibiotics have been used continuously for a number of years in rations at the experiment farm, it appears that antibiotic supplemented rations continue to support more growth than rations without antibiotics.

Table 2. Experiment I. Effect of Antibiotics in Swine Rations

Lot	1	2	3	4	5	6
Treatment[1]	Control	C	E	SPS	PS	T
Level, gm/ton	None	50-25	20-10	75-37.5	50-25	40-20
No. of pigs	11[2]	11[2]	12	12	12	12
Av. initial wt., lb.	33.6	32.5	33.2	33.1	33.2	33.2
Av. final wt., lb.	199.5	204.0	201.9	204.2	203.8	207.2
Av. days on exp.	108.5	103.1	102.7	98.8	98.8	100.0
Av. daily gain, lb.						
33-60 lbs.	0.92	1.21	1.08	1.27	1.22	1.25
60-110 lbs.	1.46	1.79	1.76	1.79	1.88	1.84
110-200 lbs.	1.86	1.70	1.84	1.92	1.90	1.92
Entire period	1.53	1.66	1.64	1.73	1.73	1.74
Av. daily feed, lb.	5.35	5.67	5.84	5.67	5.90	6.04
Feed per lb. gain, lb.	3.50	3.44	3.55	3.28	3.42	3.49

[1] C - chlortetracycline; E - erythromycin; SPS - streptomycin-penicillin-sulfaquinoxaline; PS - penicillin-streptomycin; T - Tylosin.

[2] One pig died in each lot. Cause of death was not related to experimental treatment.

Table 3. Experiment II. Effect of Antibiotics in Swine Rations

Lot	1	2	3	4	5	6
Treatment[1]	Control	C	AA	SPS	PS	T
Level, gm/ton	None	25-12.5	90	50-25	40-20	20-10
No. of pigs	12	12	12	12	12	12
Av. initial wt., lb.	26.7	26.8	26.7	26.6	26.8	26.8
Av. final wt., lb.	172.9	191.8	183.0	186.4	178.9	191.9
Av. days on exp.	103.0	102.8	102.6	102.8	102.8	101.5
Av. daily gain, lb.						
26-110 lbs.	1.19	1.32	1.34	1.35	1.31	1.39
Entire period	1.42	1.60	1.53	1.55	1.48	1.63
Av. daily feed	4.27	5.01	4.66	4.96	4.70	5.07
Feed per lb. gain, lb.	3.01	3.12	3.05	3.19	3.18	3.12

[1] C -chlortetracycline; AA - arsanilic acid; SPS - streptomycin-penicillin-sulfaquinoxaline; PS - penicillin-streptomycin; T - tylosin.